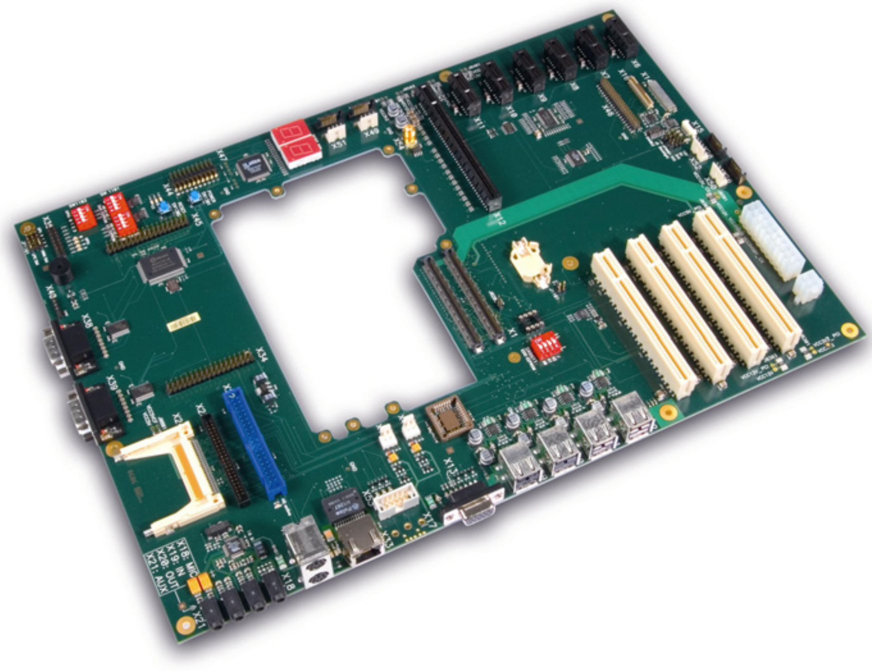
MODBASE 210

BASE BOARD FOR COM EXPRESS MODULES



USER MANUAL

Revision 0.2

Revision

Revision	Changes	Date / Name
0.2	First Edition	08.11.06 dh

DISCLAIMER

Copyright

Federal communications commission statement

- This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:
- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.
- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer’s instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.
- The us of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user’s authority to operate this equipment.

Canadian department of communications statement

- This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.
- This class B digital apparatus complies with Canadian ICES-003

SAFETY INFORMATION

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before reloading the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add device.
- Before connecting or removing signals cables from motherboard, ensure that all power cables are unplugged.
- Make sure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

Operation safety

- Before installing the motherboard and adding devices on it, carefully read the manuals that came with the package.
- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

EMC Rules

This unit has to be installed in a shielded housing. If not installed in a properly shielded enclosure, and used in accordance with the instruction manual, this product may cause radio interference in which case the user may be required to take adequate measures at his or her own expense.

IMPROTANT INFORMATION

This product is not an end user product. It was developed and manufactured for further processing by trained personnel.

RECYCLING

Please recycle packaging environmentally friendly:

Packaging materials are recyclable. Please do not dispose packaging into domestic waste but recycle it.

Please recycle old or redundant devices environmentally friendly:

Old devices contain valuable recyclable materials that should be reutilized. Therefore please dispose old devices at collection points which are suitable.

TABLE OF CONTENTS

ILLUSTRATIONS

TABLES

1 General

1.1 Revisions and Modifications

Revision	Date	Author	Comment
0.1	03.08.2006	USte	Generated, German version
0.2	08.11.2006	bkae, kol	Translated to English

1.2 Reference Documents

[1] COM Express Module Base Specification
COM Express Revision 1.0
Last update: July 10th, 2005

[2] ATX Specification
atx2_21.pdf
Version 2.2
http://www.formfactors.org

[3] PCI Local Bus Specification Rev. 2.1
PCI21.PDF
Last update: June 1st, 1995
http://www.pcisig.com

[4] JILI Specification
Jilim120.pdf
Last update: April 7th, 2003
http://www.jumptec.de/product/data/jili/index.html

[5] Digital Video Interface DVI
dvi_10.pdf
Rev. 1.0 April 2nd, 1999
http://www.ddwg.org/

[6] ATA/ATAPI-6 Specification
d1410r3b.pdf
http://www.t13.org/

[7] CF+ & CF Specification Rev. 3.0
cfspc3_0.pdf
http://www.compactflash.org/

[8] Serial ATA Specification
Serial ATA 1.0 gold.pdf
Last update: August 29th, 2002 Rev.1.0
http://www.sata-io.org/

[9] IEEE Std. 802.3-2002
802.3-2002.pdf
http://www.ieee.org

[10] Universal Bus Specification
usb_20.pdf
Last update: April 27th, 2000
http://www.usb.org

1.3 Definitions and Abbreviations

COM	Computer-On-Module
RTC	Real Time Clock
ATX	Advanced Technology Extended
PCI	Peripheral Component Interconnect
IDE	Integrated Drive Electronics
EIDE	Enhanced Integrated Drive Electronics
CF	Compact Flash
ATA	Advanced Technology Attachment
ATAPI	Advanced Technology Attachment with Packet Interface
SATA	Serial Advanced Technology Attachment
USB	Universal Serial Bus
PEG	PCI express Graphics
GPIO	General Purpose Input / Output
LVDS	Low Voltage Differential Signaling
JILI	JUMPtec Intelligent LVDS Interface
LAN	Local Area Network
VGA	Video Graphics Array
LPC	Low Pin Count
POST	Power on self test
SMBus	System Management Bus
MDI	Medium Dependent Interface

2 Introduction

2.1 Product Description

COM Express modules are compact, highly integrated Single Board Computers.

Typically a COM Express module consists of CPU, chipset, memory, video controller, Ethernet controller, BIOS flash and EIDE-, SATA- and USB controller. Interface controllers (e.g. for PCMCIA) or connectors (e.g. RJ45) are implemented on the base board on to which the COM Express module can be mounted via one or two 220-pin SMD-connectors. Beside the power supply also signals for PCI Express- and PCI-bus, EIDE, SATA, USAB, LPC etc. are present on these connectors.
The type of interfaces that is led from the COM Express module to the base board depends on the type of module that is used. The COM Express specification defines five different types which differ in number and pin assignment of the module connectors.

Thanks to the standardized mechanics and interfaces the system can be scaled arbitrarily. Despite a modular concept the systems design is very flat and compact.

COM Express modules need a base-board for successful operation.

The main board described in the following acts as an evaluation board for the modules.

Features

- Interface for COM Express module type 2 up to extended form factor
- 4 PCI slots 32Bit v2.1
- 6 PCI Express slots
- PCI Express x16 graphics / SDVO
- VGA interface
- LVDS interface
- Standard JILI / JILI40
- TV-Out
- AC'97-Link
  - → LineIn
  - → LineOut
  - → Headphone
  - → Microphone
- 40 pin IDE interface Ultra ATA-100/66/33
- 44 pin IDE interface Ultra ATA-100/66/33
- Compact flash interface Spec. v3.0
- 4 SATA channels up to 150MB/s
- 8 USB2.0 root hub interfaces
- LAN interface max. 1GBit
- LPC slot
- Pin header for GPIOs
- SuperIO W83627THF
  - → 2x PS/2
  - → 2x COM
  - → 1x IrDA
  - → 2 fan interfaces
  - → Hardware monitoring
- Power supply via ATX connector
- POST display on LPC
- Serial EEPROM on I²C-Bus
- Serial EEPROM on SMBus
- On-board BIOS Flash
- Beeper

2.2 Block Diagram

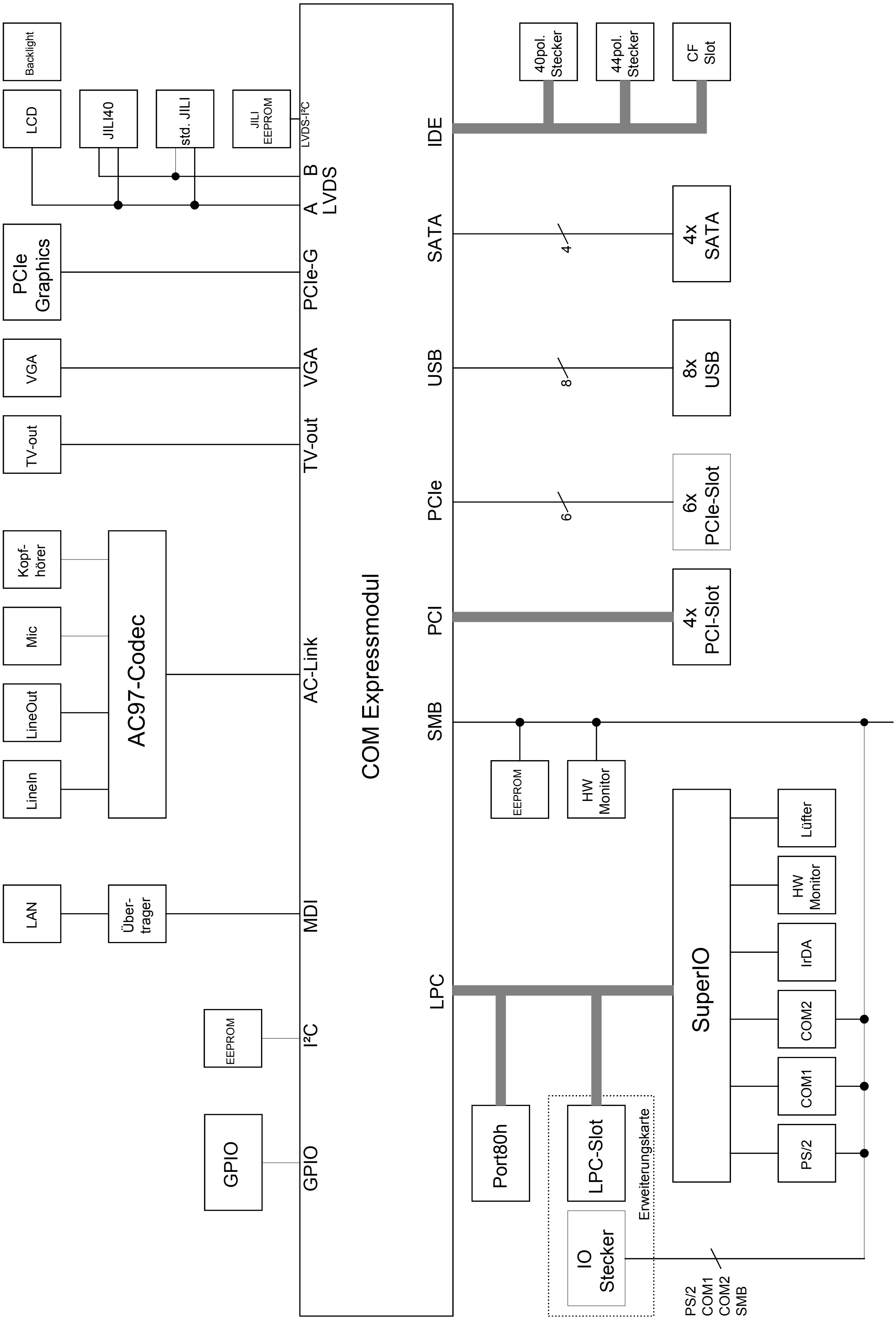


Illustration 1 Block Diagram Main Board

2.3 Positioning of the Connectors

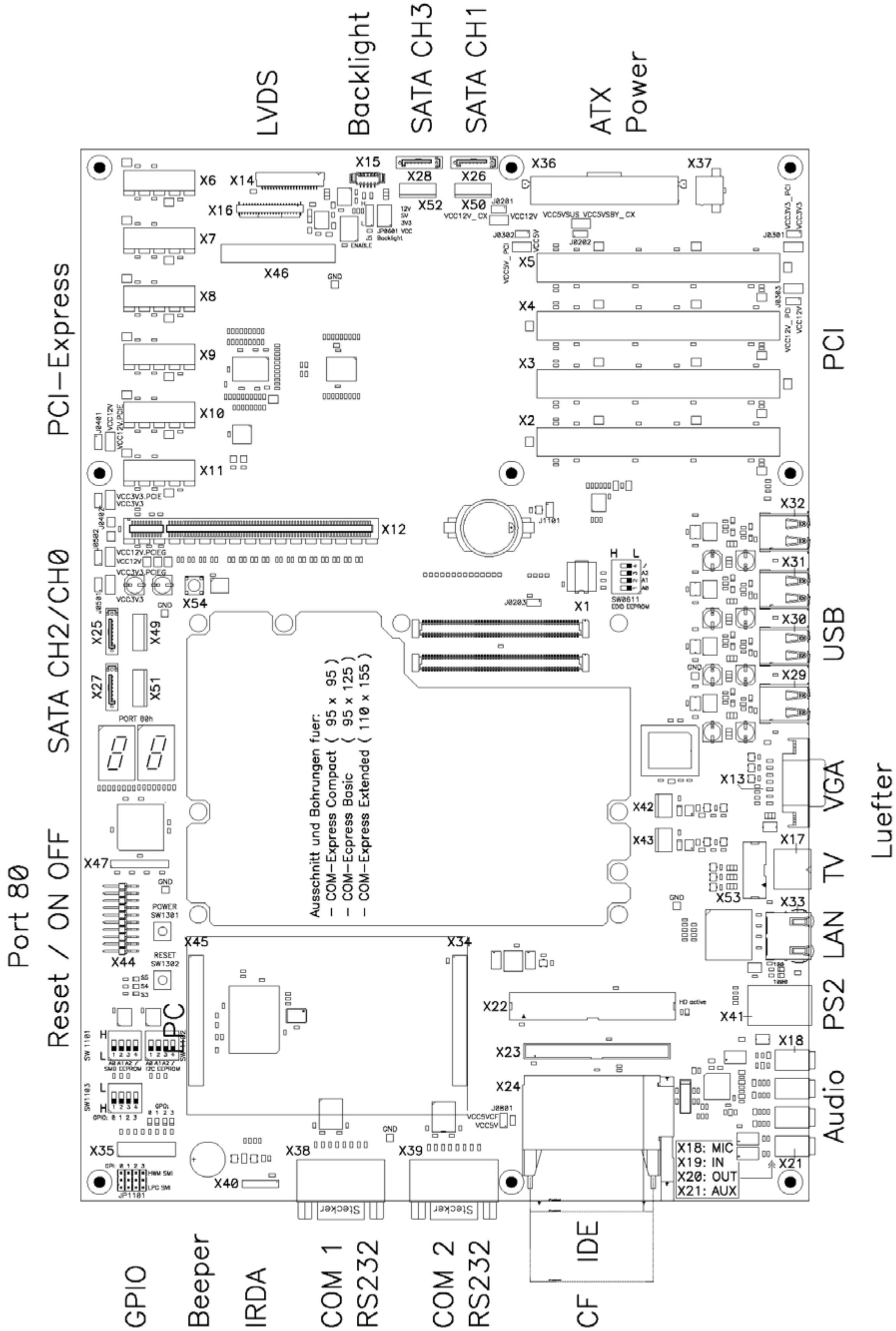


Illustration 2 Positioning of the Connectors

3 Mechanics

3.1 Dimensions

- Dimension: 254.5 mm x 36.8 mm
- Width: 1.6 mm + /-10%
- Tolerances of the drill holes: +/- 0.1mm in X and Y
- Tolerances of the diameter: + 0.1 mm

4 Hardware

4.1 Plug-in Position of the COM Express module

A plug-in for COM Express type 2 modules is available on the main board.

Following form factors are supported:

- Compact module (ELTEC specific format)
- Basic module
- Extended module

Specification

- Reference: X1
- Connector: AMP / Tyco 3-1827233-6
  0.5 mm pitch free height 440 pin 5H plug (combination of two 220pin plugs)
- Pinout: Refer to COM Express specification for type 2 module [1]

4.2 PCI Slots

Four 32-bit PCI slots are provided according to PCI specification v2.1.

The signal assignment:

- INTA#, INTB#, INTC# and INTD#
- REQ[0..3]#
- GNT[0..3]#
- IDSEL

for slot 0, slot 1, slot 2 and slot 3 is defined in the COM Express specification [1]

PCI Slot	Reference
PCI Slot 0	X2
PCI Slot 1	X3
PCI Slot 2	X4
PCI Slot 3	X5

Table 1 Assignment PCI slot to connector reference

Specification

- References: X2 - X5
- Connector: AMP / Tyco 5145154-4
- Pinout: Refer to PCI specification v2.1 [3]

4.3 PCI Express x1 Slots

One PCI Express x1 slot is assigned to each of the 6 PCI Express lanes of the COM Express module.

PCI Express Lane	References
PCI Express Lane 0	X6
PCI Express Lane 1	X7
PCI Express Lane 2	X8
PCI Express Lane 3	X9
PCI Express Lane 4	X10
PCI Express Lane 5	X11

Table 2 Assignment PCI Express Lane to connector reference

Specification

- References: X6 - X11
- Connector: AMP / Tyco 4-1612163-1
- Pinout: Refer to PCI express specification

For measuring purposes the PCI express clock is routed to test connector X54.

Specification

- References: X54
- Connector: Huber+Suhne 82 SMA-50-0-1/111NE(H)

4.4 PCI Express x16 Graphics Slot

A PCI Express X16 graphics slot is provided as plug-in for PEG graphics cards.

Depending on the chipset the PCI Express signals are multiplexed with SDVO signals, thus SDVO modules can be run in this slot as well. SDVO or PCI Express graphics will be activated automatically via PullUps of the SDVO I²C interface on the SDVO module.

Specification

- References: X12
- Connector: AMP / Tyco 4-1612163-4
- Pinout: Refer to PCI express specification

4.5 VGA Interface

An analog display can be connected via a VGA (VESA DDC) interface.

Specification

- ↘ References: X13
- ↘ Connector: Suyin 7507S-15G5T-A
- ↘ Pinout: Refer to Table 3

Pin	Signal name	Function
1	RED	Signal red
2	GREEN	Signal green
3	BLUE	Signal blue
4	RSVD	reserved
5	GND	Ground digital
6	RGND	Ground red
7	GGND	Ground green
8	BGND	Ground blue
9	+5V	+5V VDC
10	SGND	Ground Synchronisation
11	ID0	Monitor ID Bit 0 (optional)
12	SDA	DDC Data
13	HSYNC	Horizontal Sync.
14	VSYNC	Vertical Sync.
15	SCL	DDC Clock

Table 3 Pinout VGA Interface

4.6 LVDS-Interface

LCDs can be connected via a single channel LVDS interface:

Specification

- References: X14
- Connector: Hirose DF19G-20P-1H
- Pinout: Refer to Table 4
- Pin 20 can be configured via 0Ohm resistors to “OPEN” or “GND”

Pin	Signal name	Function
1	VDD	Power Supply: +3.3V
2	VDD	Power Supply: +3.3V
3	VSS	Ground
4	VSS	Ground
5	LVDS_A0-	LVDS Negative data signal (-)
6	LVDS_A0+	LVDS Positive data signal (+)
7	VSS	Ground
8	LVDS_A1-	LVDS Negative data signal (-)
9	LVDS_A1+	LVDS Positive data signal (+)
10	VSS	Ground
11	LVDS_A2-	LVDS Negative data signal (-)
12	LVDS_A2+	LVDS Positive data signal (+)
13	VSS	Ground
14	LVDS_A_CK-	LVDS Negative clock signal (-)
15	LVDS_A_CK+	LVDS Positive clock signal (+)
16	VSS	Ground
17	LVDS_A3-	LVDS Negative data signal (-)
18	LVDS_A3+	LVDS Positive data signal (+)
19	VSS	Ground
20	NC / VSS	Reserved / Ground

Table 4 Pinout Single Channel LVDS-Interface

4.6.1 LVDS EEPROM

To store configuration data of the LCD, a serial EEPROM is connected to the signals LVDS_I2C_CK and LVDS_I2C_DAT.

To avoid conflicts with configuration EEPROMs connected via the JILI connector, this EEPROM is socketed and can be assembled optionally.

4.6.2 Backlight Inverter Interface

The supply voltage of the backlight can be adjusted with jumper JP0601. The according position is printed on the PCB.

You have to set J5 depending on the backlight inverter you use.

If the inverter needs a low active start signal, jumper J5 has to be set to L (pin1 connected to pin2).

If the inverter needs a high active start signal, jumper J5 has to be set to H (pin2 connected to pin3).

Brightness of the backlight inverter is controlled via the LVDS-BKLT-CTRL signal.

As the LVDS-BKLT-CTRL signal of the COM Express module is supplied as PWM signal by actual chipsets, this signal initially is integrated and then limited to the maximum allowable voltage of the backlight inverter via voltage divider.

Control voltage: 0...3V
A value of 0V corresponds to maximum brightness.

Specification

- References: X15
- Connector: Molex (53047-0510) 53261-0590
- Pinout: Refer to Table 5

Pin	Signal name	Function
1	VCC	Power supply backlight
2	GND	Ground
3	BLON#	Backlight On
4	VCON	Brightness control
5	GND	Ground

Table 5 Pinout Backlight

4.7 JILI Interface

4.7.1 Standard JILI Connector

A standard JILI connector can be used alternatively for connection of LCDs.
Both, single and dual channel LCDs, can be adapted to the main board via small additional PCBs.

Specification

- References: X16
- Connector: Hirose FH12-40S-0.5SV
- Pinout: "standard JILI" according to JILI specification [4]

4.7.2 JILI40 Connector

Any LCD display can be adapted via a JILI40 connector.

Two 24 bit LVDS channels are present on this 40-pin header

Specification

- References: X46
- Connector: Samtec TMM-120-01-LM-D-SM-P
- Pinout: "JILI40" according to JILI specification [4]

4.8 TV Out

A TV-OUT connector is implemented for displaying the video signal on a TV set (or the like). The main board supports the following video signals

- Composite Video
- Component Video (YPbPr)
- S-Video

The type of the video signal is defined by the graphics controller on the COM Express module.

Specification

- References: X17
- Connector: AMP 5786766-1
- Pinout: Refer to Table 6

Pin	Signal name	Composite	Component	S-Video
1	TV_IRTN_B	Ground	Ground	Ground
2	TV_IRTN_C	Ground	Ground	Ground
3	TV_DACB	not used	Luminance (Y)	Luminance
4	TV_DACC	not used	Chrominance (Pr)	Chrominance
5	TV_DACA	CVBS	Chrominance (Pb)	not used
6	TV_IRTNA	Ground	Ground	Ground
7	RSVD	reserved	reserved	reserved

Table 6 Pinout TV-Out

The signals can be adapted to another connector with a 10-pin header.

Specification

- References: X53
- Connector: IDC-M 10pol. THT RM2.54
- Pinout: Refer to Table 7

Pin	Signal	Pin	Signal
1	GND	2	TV_DACA
3	GND	4	TV_DACB
5	GND	6	TV_DACC
7	GND	8	GND
9	GND	10	GND

Table 7 Pinout TV-Out Pin header

4.9 Audio

An AC'97 codec V2.2 is connected to the AC link of the COM Express module. Footprint and circuit are compatible to following AC'97 codecs:

- VIA VT1612A
- Realtek ALC650

Following NF signals are provided by the AC'97 codec:

↘ Mono Microphone
↘ Stereo LineIn
↘ Stereo LineOut
↘ Stereo Headphone

4.9.1 Mono-Microphone

Bias voltage for capactior microphones is provided.

Specification

↘ References: X18
↘ Connector: Kycon ST-3000
↘ Pinout: Refer to Table 8

Pin	Signal name	Function
1	GND	Ground
2	MIC_BIAS	Bias initial load (ring)
3	MIC	NF signal (tip)

Table 8 Pinout Microphone

4.9.2 Stereo LineIn

Specification

↘ References: X19
↘ Connector: Kycon ST-3000
↘ Pinout: Refer to Table 9

Pin	Signal name	Function
1	GND	Ground
2	LINEIN_R	NF signal right (ring)
3	LINEIN_L	NF signal left (tip)

Table 9 Pinout LineIn

4.9.3 Stereo LineOut

Specification

↘ References: X20
↘ Connector: Kycon ST-3000
↘ Pinout: Refer to Table 10

Pin	Signal name	Function
1	GND	Ground
2	LINEOUT_R	NF signal right (ring)
3	LINEOUT_L	NF signal left (tip)

Table 10 Pinout LineOut

4.9.4 Stereo Headphone

Specification

- ↘ References: X21
- ↘ Connector: Kycon ST-3000
- ↘ Pinout: Refer to Table 11

Pin	Signal name	Function
1	GND	Ground
2	HPOUT_R	NF signal right (ring)
3	HPOUT_L	NF signal left (tip)

Table 11 Pinout Headphone

4.10 IDE Interface

A standard IDE interface is provided according to ATA/ATAPI, with the controller supporting at least Ultra-ATA100 with 100 MB/sec data rate. The transfer mode that can be selected depends on how the system is wired and which modes are supported by the drives.

4.10.1 Primary IDE Channel

4.10.1.1 40-pin IDE interface

A 40-pin IDC connector is provided at the primary IDE channel for standard IDE drives.

Specification

- ↘ References: X22
- ↘ Connector: FCI 75869-118
- Pinout: Refer to Specification ATA/ATAPI-6
  Source [6], page 400, Table A3

4.10.1.2 44-pin IDE Interface

For connection of 2.5” hard disks, a 44-pin IDC connector is provided at the primary IDE channel.

Specification

- ↘ References: X23
- ↘ Connector: Yamaichi ZP7-44-S-G
- ↘ Pinout: Refer to Specification ATA/ATAPI-6
  Source [6], page 412, Table A16

4.10.1.3 Compact Flash Interface

A socket for compact flash cards, type I/II, is provided at the primary IDE channel.

The compact flash interface supports True IDE mode according to compact flash specification rev. 3.0. Inter alia the compact flash specification rev. 3.0 supports the UDMA mode.

Specification

- ↘ References: X24
- ↘ Connector: Yamaichi CF050P2-003-10-D2
- ↘ Pinout: Refer to specification "CF+ & CF specification rev. 3.0"
  Source [7] , page 24, table 4

4.11 SATA-Interface

For SATA drives four connectors are populated with SATA interface (signals + power).
Every SATA signal connector has its own power supply connector.

SATA Channel	References
SATA 0	X25
SATA 1	X26
SATA 2	X27
SATA 3	X28

Table 12 Assignment SATA Channel to Connector Reference

Specification SATA signal connector

- References: X25 - X28
- Connector: Molex 87713 series
- Pinout: Refer to Specification SATA Source [8], page 46, table 3

Specification Power Supply

- References: X49 - X52
- Connector: AMP 171825-4
- Pinout: Refer to ATX specification v2.2 [2]; "Floppy Drive Power Connector"

4.12 USB Topology

Eight USB ports are provided by the COM Express module.

The exact assignment of each port is defined in the following table:

USB-Port	References	Description
USB0	X29	External dual connector 1
USB1	X29	External dual connector 1
USB2	X30	External dual connector 2
USB3	X30	External dual connector 2
USB4	X31	External dual connector 3
USB5	X31	External dual connector 3
USB6	X32	External dual connector 4
USB7	X32	External dual connector 4

Table 13 Assignment USB Ports

4.12.1 USB Power Supply

The power supplies are protected by USB power switches. In addition to that the input voltages of the USB power switches are protected by resetable fuses.

The USB power switches have the following functions:

- The output current is limited to 500mA per port
- A signal to detect overcurrent is generated for each two ports
- USB0 and USB1 have one common signal to detect overcurrent
- USB2 and USB3 have one common signal to detect overcurrent
- USB4 and USB5 have one common signal to detect overcurrent
- USB6 and USB7 have one common signal to detect overcurrent

Specification

- References: X29 - X32
- Connector: AMP 787617-2 (Dual USB connector type A)
- Pinout: according to USB specification 2.0 [10]

4.13 Ethernet

The mainboard can be connected to a local area network with an ethernet interface.
The COM Express module already provides MDI signals, so that there is only the transformer on the mainboard required.

The transformer PULSE H 5004 not only supports 10BaseT and 100BaseTX but also 1Gbit.

Specification

- References: X33
- Connector: AMP 2-406549
- Pinout: Refer to IEEE Std. 802.3 [9], section three, page 225

4.14 LPC Slot

You have an LPC slot available to insert extension board with LPC interface.

Specification

- ↘ References: X34
- ↘ Connector: 36-pin header, 2.54mm
- ↘ Pinout: Refer to Table 14

Pin	Signal	Pin	Signal
1	VCC5V	2	VCC5V
3	NC	4	VCC3V3
5	VCC3V3	6	NC
7	VCC3V3_SBY	8	GND
9	GND	10	LPC_RST#
11	GND	12	LPC_LAD0
13	LPC_LAD1	14	LPC_LAD2
15	LPC_LAD3	16	LPC_FRAME#
17	GND	18	LPC_DRQ0
19	GND	20	LPC_CLK
21	GND	22	LPC_PWRDWN
23	GND	24	PME#
25	GND	26	LPC_SMI#
27	GND	28	SERIRQ
29	GND	30	PCI_CLKRUN#
31	GND	32	CPU_RST#
33	GND	34	LPC_DRQ1#
35	GND	36	GND

Table 14 Pinout LPC-Slot

4.15 I/O Connector

An alternative SuperIO controller can be integrated via a 36-pin connector. In this case the onboard chip is not populated and a piggy back board with the SuperIO chip is plugged into the I/O and into the LPC connector.

Specification

- References: X45
- Connector: CAB 1002-161-036
- Pinout: Refer to Table 15

Pin	Signal	Pin	Signal
1	SMB_CLK	2	SLP_S3#
3	SMB_DAT	4	SLP_S4#
5	KBDAT	6	SLP_S5#
7	KBCLK	8	EXT_THRM#
9	MSDAT	10	SMBALERT#
11	MSCLK	12	NC
13	NC	14	THRMTRIP#
15	NC	16	BATLOW#
17	NC	18	NC
19	NC	20	NC
21	COM1_DCD#	22	COM2_DCD#
23	COM1_RXD	24	COM2_RXD
25	COM1_TXD	26	COM2_TXD
27	COM1_DTR#	28	COM2_DTR#
29	COM1_DSR#	30	COM2_DSR#
31	COM1_RTS#	32	COM2_RTS#
33	COM1_CTS#	34	COM2_CTS#
35	COM1_RI#	36	COM2_RI#

Table 15 Pinout I/O-Connector

4.16 GPIO

The COM Express module provides four general purpose outputs and four general purpose inputs.

The GPIs have PullUp resistors and are routed to a dip switch (SW1103). With the dip switch the GPIs can be connected to ground. The assignment GPI – switch – level is printed on the PCB.

If the PullUp resistors are not populated, you can switch LPC_SMI# or HWM_SMI# to GPI0, GPI1, GPI2 or GPI3 with jumper JP1101.

The GPOs are connected to LEDs to optically display the status.

Specification

- References: X35
- Connector: CAB 1002-161-036
- Pinout: Refer to Table 16

Pin	Signal	Pin	Signal
1	GPI0	2	GND
3	GPI1	4	GND
5	GPI2	6	GND
7	GPI3	8	GND
9	GPO0	10	GND
11	GPO1	12	GND
13	GPO2	14	GND
15	GPO3	16	GND

Table 16 Pinout GPIO connector

4.17 ATX Connector

An ATX connector with additional ATX12V connector is available for power supply of the system.

Specification ATX connector

- References: X36
- Connector: Molex 44206-0007
- Pinout: Refer to ATX specification v2.2 [2]

Specification ATX12V connector

- References: X37
- Connector: Molex 39-29-9042
- Pinout: Refer to ATX specification v2.2 [2]

4.18 SuperIO

The Winbond SuperIO W83627THF is integrated on the base board.

Interfaces used by the SuperIO

- 2 RS232 interface (function of COM port shared with IrDA interface)
- 1 IrDA interface (function shared with COM port)
- PS/2 interface for keyboard and mouse
- 2 fan interfaces
- 4 voltage control
- 1 temperature control

4.18.1 COM Ports

Characteristics of the COM ports

- RS232 standard
- RS232 transceiver ESD protected +/- 15kV
- EMC improvement by using EMI filters in the signal lines

The exact assignment of each single port to the connector reference can be seen from the following table:

COM Port	References
COM 1	X38
COM 2	X39

Table 17 Assignment COM Ports to Connector Reference

Specification

- ↘ References: X38 and X39
- ↘ Connector: Weitronic 107-091-10-10-10
- ↘ Pinout: Refer to Table 18

Pin	Signal name	Function
1	DCD#	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR#	Data Terminal Ready
5	GND	Ground
6	DSR#	Data Set Ready
7	RTS#	Request To Send
8	CTS#	Clear To Send
9	RI#	Ring Indicator

Table 18 Pinout COM Ports

4.18.2 IrDA

The connectors of the IrDA interface are designed for commercial IrDA transmitters.

Specification

- ↘ References: X40
- ↘ Connector: CAB 1001-161-005
- ↘ Pinout: Refer to Table 19

Pin	Signal name	Function
1	+5V	Power supply
2	NC	Not connected
3	IRRX	Received data
4	GND	Ground
5	IRTX	Transmission data

Table 19 Pinout IrDA

4.18.3 PS/2

You have a double PS/2 connector for PS/2 keyboards and PS/2 mice. The upper jack only supports PS/2 mice. The pins of the lower jack provide both, signals for PS/2 keyboards and those for PS/2 mice. Keyboards can be connected directly, mice can only be operated using an according Y-adapter.

Specification

- ↘ References: X41
- ↘ Connector: Tyco 84376-1
- ↘ Pinout: Refer to Table 20 and Table 21

Pin	Signal name	Function
1	MSDAT	Mouse Data
2	NC	not connected
3	GND	Ground
4	+5V	VCC
5	MSCLK	Mouse Clock
6	NC	not connected

Table 20 Pinout Upper PS/2 Jack

Pin	Signal name	Function
1	KBDAT	Keyboard Data
2	MSDAT	Mouse Data
3	GND	Ground
4	+5V	VCC
5	KBCLK	Keyboard Clock
6	MSCLK	Mouse Clock

Table 21 Pinout Lower PS/2 Jack

4.18.4 Fan interface

Two PWM controlled fan interfaces are integrated on the mainboard. They are located near the COM Express modul.

Evaluation of the tacho signal and control of the revolution speed is done by the SuperIO.

Specification

- ↘ References: X42 - X43
- ↘ Connector: Molex 22-04-1031
- ↘ Pinout: Refer to Table 22

Pin	Signal name	Function
1	GND	Ground
2	PWM	PWM signal
3	TACHO	Tacho signal

Table 22 Pinout Fan Interface

4.18.5 SuperIO Hardware Monitor

You can check different voltages and temperatures on the hardware monitor that is integrated in the SuperIO.

Monitored voltages

- ↘ VBAT
- ↘ 3.3V
- ↘ 12V
- ↘ 5V

Measured temperatures

- ↘ Ambient temperature

The temperature is measured with a thermistor.

4.19 SMB Hardware Monitor

In addition to the SuperIO hardware monitor you can also connect a SMBus hardware monitor.
This chip enables you to control different voltages, temperatures and revolution speeds in legacy-free-designs where the SuperIO is not supported.

Hardware monitor:

- ↘ Winbond W83L786R

Controlled voltages

- ↘ VBAT
- ↘ 3.3V
- ↘ 12V
- ↘ 5V

Measured temperatures

- ↘ Ambient temperature

The temperature is measured with a thermistor.

Fan interface

For evaluation and control of the revolution speeds please refer to chapter 4.17.4.

4.20 Serial EEPROM at SMBus

For testing purposes a serial EEPROM (4kBit) is connected to the SMBus. To avoid address conflicts, the address can be selected with dip switch SW1101.

4.21 Serial EEPROM at I2C-Bus

For testing purposes a serial EEPROM (4kBit) is connected to the I²C bus. To avoid address conflicts, the address can be selected with dip switch SW1102.

4.22 OnBoard BIOS-Flash

There is a PLCC32 socket on the mother board, where an additional firmware hub can be inserted. To boot this from firmware hub, the firmware hub on the COM Express module has to be switched off.

4.23 POST-Code Display

For debugging purposes an POST code display is implemented on the main board, thus enabling the display of BIOS outputs on IO-port 80h and/or Port 90h.

In addition to that these signals are output on a pin header. For protocolling purposes a logic analyser can be connected here.

The pinout of the output connector X44 corresponds to the pinout of the Hewlett Packard HP-PODs.

Specification

- ↘ References: X44
- ↘ Connector: 20-pin header 2.54mm
- ↘ Pinout: Refer to Table 23

Pin	HP-POD	Function	Pin	HP-POD	Function
1	+5V	not used	2	CLK2	LPC_CLK
3	CLK1	not used	4	D15	not used
5	D14	not used	6	D13	Test signal 3
7	D12	Test signal 2	8	D11	Test signal 1
9	D10	Test signal 0	10	D9	not used
11	D8	Strobe	12	D7	Data 7
13	D6	Data 6	14	D5	Data 5
15	D4	Data 4	16	D3	Data 3
17	D2	Data 2	18	D1	Data 1
19	D0	Data 0	20	GND	Ground

Table 23 Pinout POST Display (HP-POD)

4.23.1 Lattice Programming Interface

A connector used to program the PLD to decode the POST codes is implemented. To reprogram the PLD a Lattice programming adapter is required.

Specification

- References: X47
- Connector: CAB 714-91-164-31-007 (socket)
- Pinout: Refer to Table 24

Pin	Signal name	Function
1	VCC	Power Supply
2	SDO_TDO	Serial Data Out
3	SDI_TDI	Serial Data In
4	ISPEN#	Programming Enable
5	KEY	Keypin
6	MODE_TMS	Programming Mode
7	GND	Ground
8	SCLK_TCK	Serial Clock

Table 24 Pinout Lattice Programming Interface

4.24 Battery

The RTC on the COM Express module is buffered with a socketed battery on the main board.

To be able to clear the CMOS memory, the battery voltage is connected via jumper J1101 to the COM Express module.

Type of battery: 2032

Battery socket: Renata SMTU2032-1

4.25 Beeper

A piezo signal generator is implemented for acoustic signals.

Type: Digisound F/DGX05P

4.26 Power Button

For switching the system on a Power push button has been implemented.

The PWR_BTN# signal is low-active and is connected directly to the corresponding pin of the COM Express module.

Type: C&K JTP-1230F

4.27 Reset of the System

You have a special push button to reset the system.

The RESET# signal is low-active and is connected to the SYS_RESET#- pin of the COM Express module.

Type: C&K JTP-1230F

4.28 Miscellaneous

4.28.1 Measuring Resistors for current measuring

Measuring resistors are inserted into the power supply lines of the COM Express module, the PCI express graphics slot as well as into every single PCI slot and into one PCI express x1 slot.

In addition to these resistors there is one jumper each to be able to measure the current using a wire loop and a clamp meter.

4.28.2 Ground Pins

There are several ground pins all over the main board for connection of measuring instruments.

4.28.3 Sleep State LED Display

The ELTEC MODBASE 210 has 3 LEDs to display the SleepStates.

LED1201 displays status S3
LED1202 displays status S4
LED1203 displays status S5